

CLAIM LISTING AND STATUS

1. (Currently Amended) A semiconductor laser, comprising:

a substrate;

an epitaxial structure deposited on said substrate;

a monolithic semiconductor laser cavity formed in said epitaxial structure, said cavity having at least one segment and at least one output;

at least one etched gap extending through said at least one segment and separating said segment into first and second spaced apart sections; and

at least one distributed Bragg reflector (DBR) etched in said epitaxial structure at said at least one output.

2. (Withdrawn) The laser of claim 1, wherein the total length of said laser cavity is between about 10  $\mu\text{m}$  and about 10,000  $\mu\text{m}$ .

3. (Previously Presented) The laser of claim 1, wherein said at least one laser cavity segment includes an active region and said etched gap comprises spaced-apart etched facets extending through said active region, and wherein said gap has a length of between about 0.001  $\mu\text{m}$  and about 10  $\mu\text{m}$ .

4. (Withdrawn) The laser of claim 1, further including at least one photonic device coupled to an output of said laser cavity.

5. (Withdrawn) The laser of claim 1, wherein the laser is a ring laser having multiple segments joined end-to-end.

6. (Previously Presented) The laser of claim 1, wherein the laser cavity includes two segments joined at an etched output facet, said at least one etched gap in at least one segment providing improved unidirectionality.

7. (Withdrawn) A semiconductor laser, comprising:  
a monolithic semiconductor laser cavity having at least one segment and at least one output;  
at least one etched gap extending through said at least one segment of the laser,  
at least one photonic device coupled to said at least one output of said laser, and  
at least an etched facet at or near the Brewster angle at one end of said photonic device.

8. (Withdrawn) The laser of claim 7, wherein the total length of said laser cavity is between about 10  $\mu\text{m}$  and about 10,000  $\mu\text{m}$ .

9. (Withdrawn) The laser of claim 7, wherein said at least one etched gap has a length of between about 0.001  $\mu\text{m}$  and about 10  $\mu\text{m}$ .

10. (Withdrawn) A semiconductor photonic device, comprising:

a first cavity having at least one segment including an entrance facet and an exit facet; at least an etched facet at or near the Brewster angle at one end of said at least one segment;

a second cavity having at least one segment directly coupled to said first cavity entrance facet; and

at least two spaced etched facets forming a gap extending through said second cavity.

11-12. (Cancelled)

13. (Withdrawn) The photonic device of claim 10, wherein said first cavity segment is a V-shaped structure incorporating a first and a second leg.

14. (Withdrawn) The photonic device of claim 13, wherein said etched facet at or near the Brewster angle is at an end of said first leg of said V-shaped structure.

15. (Withdrawn) The photonic device of claim 14, wherein said first and second legs are joined at corresponding ends to form said V-shaped structure, and wherein said exit facet is positioned at the joint of said first and second legs.

16. (Withdrawn) The photonic device of claim 15, wherein said entrance facet is at a free end of said second leg of said V-shaped structure.

17. (Withdrawn) The laser of claim 15, wherein said second cavity is a laser cavity having at least one segment that incorporates multiple etched gaps, each gap extending through said at least one segment.

18. (Withdrawn) The laser of claim 17, wherein each of said gaps comprises a pair of spaced-apart etched facets.

19. (Withdrawn) The laser of claim 10, wherein said second cavity incorporates multiple etched gaps.

20. (Withdrawn) The laser of claim 19, wherein said second multiple etched gaps comprises first and second gaps spaced apart along said second cavity and separated by a segment of said cavity.

21. (Withdrawn) The laser of claim 20, wherein each said gap comprises a pair of spaced-apart etched facets, each pair of facets forming a gap having a length of between about 0.001  $\mu\text{m}$  and about 10.0  $\mu\text{m}$  extending completely through the laser cavity.

22. (Withdrawn) The laser of claim 21, wherein each facet is perpendicular to the length of said segment.

23. (Withdrawn) The laser of claim 21, wherein each said facet is angled with respect to the length of said segment.

24. (Withdrawn) The laser of claim 23, wherein said segment between said first and second gaps is offset from adjoining portions of said second cavity to compensate for the refraction of light at the interfaces of the laser segment and said gaps.

25. (Currently Amended) A semiconductor device, comprising:

a substrate;

an epitaxial structure deposited on said substrate;

a monolithic semiconductor waveguide cavity formed in said epitaxial structure

having at least one segment;

an etched gap extending through said semiconductor waveguide cavity in said at least one segment and separating said segment into first and second spaced apart sections, said etched gap comprising a pair of parallel etched facets spaced apart by a length of between about 0.001  $\mu\text{m}$  and 10  $\mu\text{m}$ .

26. (Previously presented) The device of claim 25, further including multiple etched gaps spaced along said waveguide cavity.

27. (Withdrawn) The device of claim 26, wherein said gaps are angled, and further including an offset segment of said waveguide cavity between adjacent gaps.

28. (Withdrawn) The device of claim 26, wherein said semiconductor waveguide cavity incorporates multiple legs coupled to form a ring laser.

29. (Withdrawn) The device of claim 28, said ring laser further including an exit facet coupled to an input facet of a photonic device.

30. (Withdrawn) The device of claim 29, wherein said photonic device is a V-shaped waveguide structure having an etched facet at or near the Brewster angle at a distal end.

31. (Currently Amended) A semiconductor laser, comprising:  
a substrate;  
an epitaxial structure deposited on said substrate;  
a monolithic semiconductor laser cavity formed in said epitaxial structure and  
having multiple segments joined end-to-end to an etched facet to provide a laser output; and  
at least one etched gap extending through at least one of said segments and  
separating said at least one segment into first and second spaced apart sections segment.

32. (Previously Presented) The laser of claim 31, further including a DBR located externally of said laser cavity and adjacent said output etched facet.

33. (Withdrawn) The laser of claim 31, wherein the laser cavity includes three segments joined end-to-end to form a triangular ring laser, and includes at least one etched gap in at least one of said segments to enhance unidirectionality in said laser.

34. (Withdrawn) The laser of claim 33, further including a photonic device coupled to said output, said photonic device including a facet at the Brewster angle to minimize back-reflection into said laser cavity.

35. (Withdrawn) The laser of claim 31, including at least one etched gap extending through each of at least two of said segments.

36. (Withdrawn) The laser of claim 31, wherein laser light propagates along an optical axis of said ring cavity, and wherein said at least one etched gap includes etched facets spaced apart along said optical axis.

37. (Withdrawn) The laser of claim 36, wherein said etched facets are perpendicular to said optical axis.

38. (Withdrawn) The laser of claim 36, wherein said etched facets are parallel to each other and are angled with respect to said optical axis.

39. (Withdrawn) The laser of claim 36, further including at least first and second etched gaps spaced apart along said optical axis to define an intermediate segment between the gaps, and each of said gaps including a pair of spaced, parallel facets.

40. (Withdrawn) The laser of claim 39, wherein said intermediate segment is offset from said optical axis, and wherein the facets of each of said gaps are angled with respect to said optical axis to compensate for the refraction of light at said facets.

41. (Withdrawn) The laser of claim 40, wherein said gaps are angled in opposite directions with respect to said optical axis.

42. (Withdrawn) A semiconductor laser, comprising:  
a monolithic semiconductor waveguide cavity having multiple segments joined along an optical axis, an active region for generating light in said cavity, and an output facet for emitting generated light;

at least one air gap extending through one of said segments to enhance unidirectionality in the waveguide, said air gap being defined by first and second parallel etched facets at an angle to said axis and spaced apart by between about 0.0001  $\mu\text{m}$  and about 10  $\mu\text{m}$ .

43. (Withdrawn) The semiconductor laser of claim 42, further including a photonic device having a near end and a distal end and coupled at its near end to said output facet, said

photonic device incorporating a facet at the Brewster angle at its distal end to minimize back-reflection of said light.

44. (Withdrawn) The semiconductor laser of claim 42, wherein said multiple segments are joined to form a ring laser or a V-shaped laser, with first and second segments being joined at said exit facet.

45. (Withdrawn) The semiconductor laser of claim 44, further including multiple spaced-apart air gaps in at least one of said segments, each air gap being defined by parallel etched facets at an angle to said axis and spaced apart by between about 0.0001  $\mu\text{m}$  and about 10  $\mu\text{m}$ .

46. (Withdrawn) The semiconductor laser of claim 45, wherein said angle is substantially 90°.

47. (Withdrawn) The semiconductor laser of claim 45, wherein first and second spaced-apart air gaps define an intermediate waveguide segment between the gaps, said intermediate segment being offset to compensate for refraction at the etched facets of the first and second air gaps.